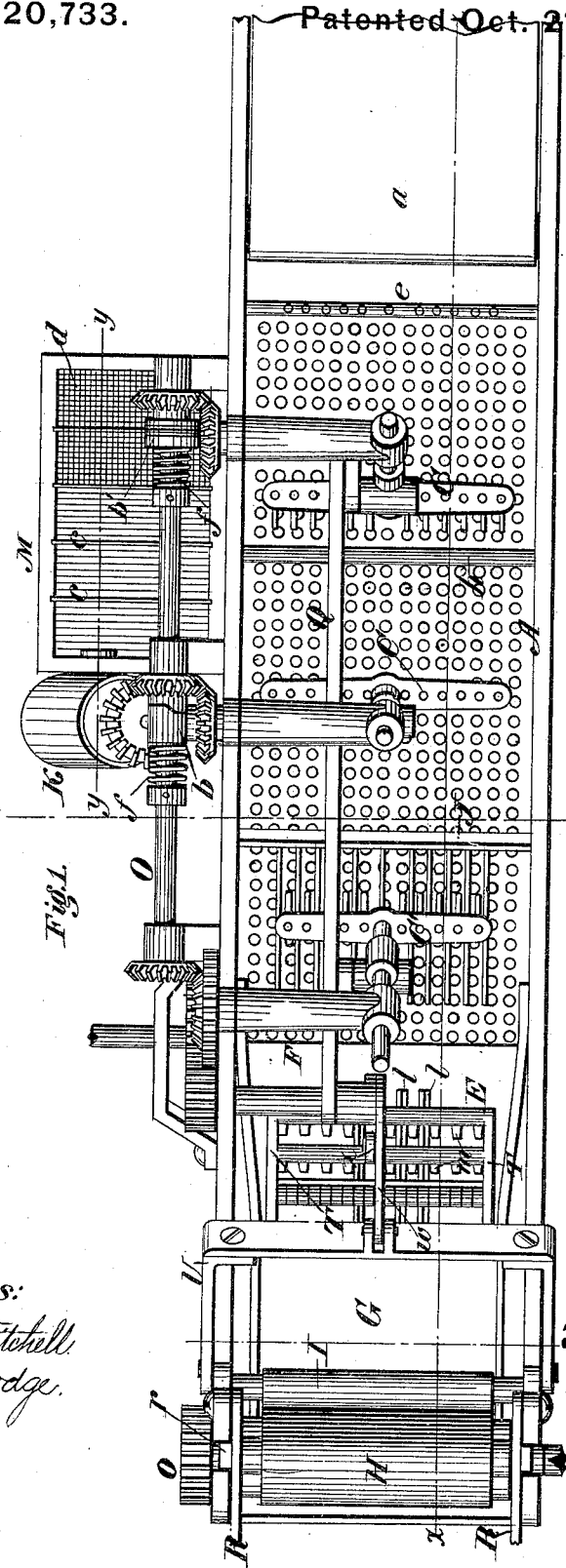


F. G. SARGENT.
Wool-Washing Machine.

No. 220,733.

~~Patented Oct. 21, 1879.~~



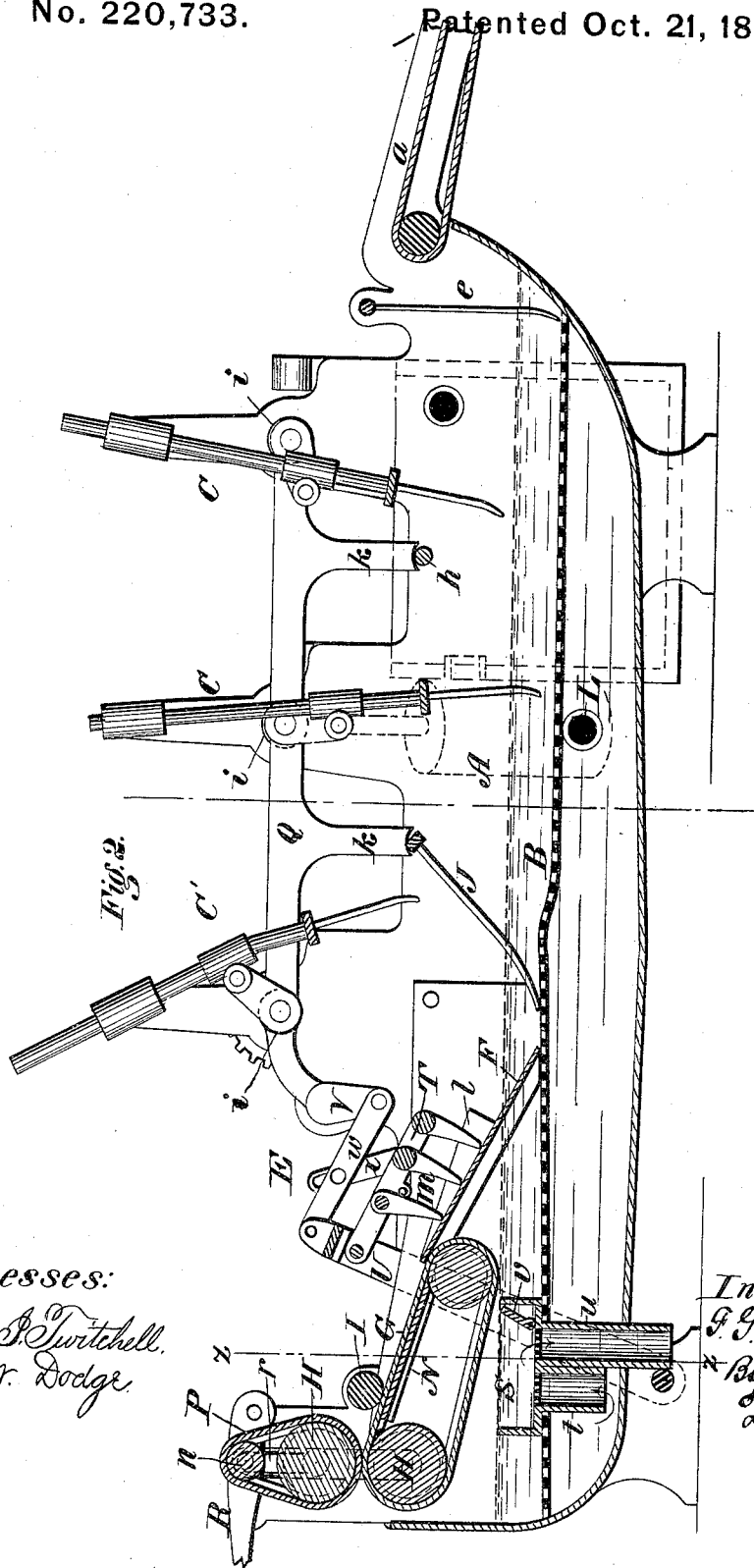
Witnesses:
Donn J. Twitchell.
Will N. Dodge.

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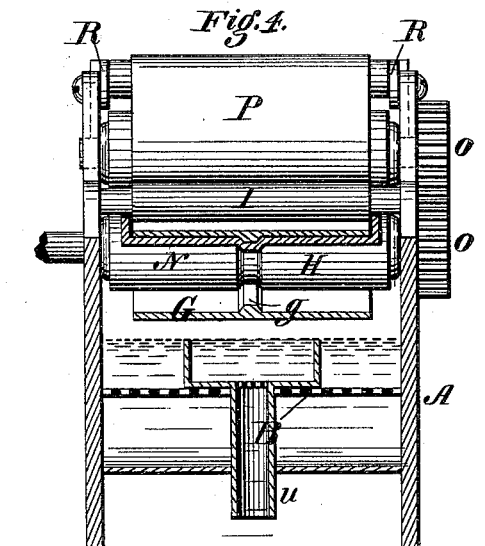
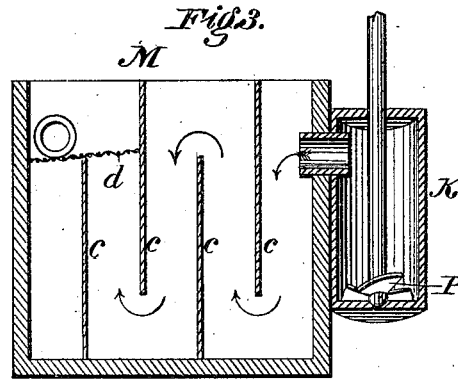
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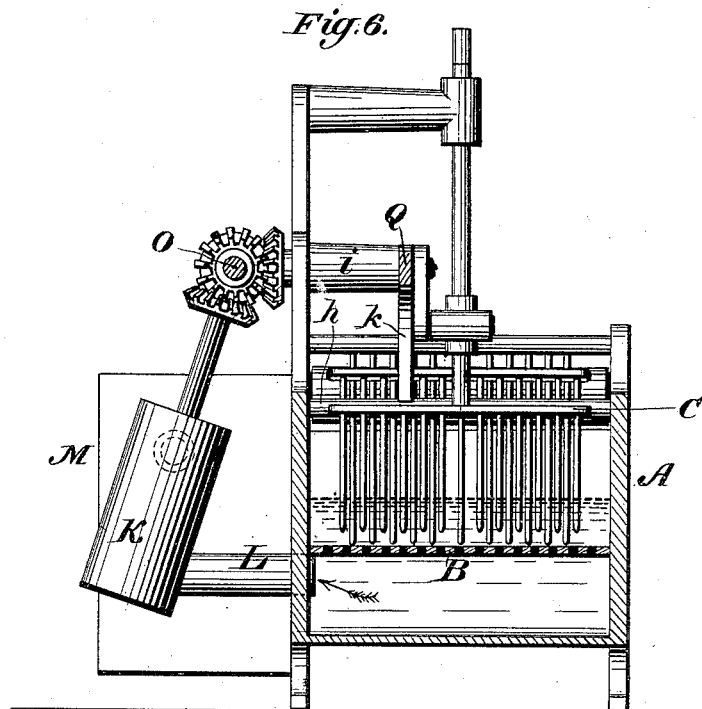
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UNITED STATES PATENT OFFICE.

FREDERICK G. SARGENT, OF GRANITEVILLE, MASSACHUSETTS.

IMPROVEMENT IN WOOL-WASHING MACHINES.

Specification forming part of Letters Patent No. 220,733, dated October 21, 1879; application filed August 28, 1878.

To all whom it may concern:

Be it known that I, FREDERICK G. SARGENT, of Graniteville, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Wool-Washing-Machines, of which the following is a specification.

My invention relates to that class of wool-washing machines in which wool is deposited in a tub or tank supplied with a cleansing-liquid, and carried through the same by means of vibrating rakes or carriers, which pass the wool to an elevator, by which it is delivered to the press-rolls, and by them from the machine; and the improvements consist in imparting motion to the rakes or carriers through yielding connections, whereby any one or more of the series may yield and exert only a moderate forward pressure without affecting the others; in means for drawing the liquid from the tub, purifying, and returning the same to the tub while the machine is in operation; in providing a means whereby the sediment may be removed from the bottom of the tub when the machine is used for rinsing; and in certain details of construction, hereinafter explained.

Figure 1 represents a top-plan view of my improved machine; Fig. 2, a longitudinal vertical section of the same on the line *xx* of Fig. 1; Fig. 3, a section through the apparatus for purifying the liquid, taken on the line *yy* of Fig. 1; Fig. 4, a transverse vertical section on the line *zz* of Fig. 2; Fig. 5, a cross-section of the belt; and Fig. 6, a cross-section, showing the manner in which the sleeves are sustained.

The chief objects of this invention are to hold the wool longer under the action of the cleansing-liquid, permit the long-continued use of the same liquid, and to secure the removal of sediment from the tub when in use as a rinser or washer.

To accomplish the first of these objects, it is essential that a larger supply of wool be placed and maintained in the tub than has heretofore been customary, and this in turn renders it necessary to so connect the rakes or carriers with the shaft or mechanism by which they are driven that they shall individually yield when too great a quantity of wool accumulates for them to handle, as otherwise the rakes or

carriers would be liable to become twisted or broken. It is also necessary to provide means for controlling the quantity of wool taken from the tub by the elevator, and to give firm support to the carriers.

A represents the tub or tank, provided, as usual, with a perforated diaphragm, B, over which the wool is carried by vibrating rakes or carriers C C', the dirt or sediment falling through the diaphragm to the bottom of the tub or tank. The wool to be cleansed is deposited in the tub or tank by means of a conveyer-apron, *a*, in the usual manner, falling behind a swinging gate, *e*, which tends to hold it back until taken by the first of the rakes C, by which it is carried to the next rake of the series, and so on until it is delivered to the elevator, to be thereby discharged from the machine.

As above stated, it is designed to fill the tub nearly full of wool, in order that it may remain for a considerable time in the liquid with which the tub is supplied, the wool being delivered from the machine no faster than it is fed into the same, thus keeping a quantity always in soakage, and thereby causing a more perfect loosening of the dirt.

In order that the rakes or carriers C C' shall not be strained or broken by having to handle too great an accumulation of the wool at once, the rakes are connected with the driving-shaft O by means of yielding or spring connections or couplings *b b'*, which may be of any suitable construction which will enable them to disengage themselves from the rakes when the amount of wool is too great for them to handle, but cause them to engage therewith again as soon as the quantity is sufficiently lessened.

In the drawings two forms of coupling are shown in Fig. 1, the first consisting of a spring-clutch, having its interlocking lugs or teeth made of V form, so that they shall ride back and disengage from each other when the resistance becomes great, and the second consisting of friction plates or disks, held in contact by means of a spring, *f*. By regulating or adjusting the pressure of its spring, either of these devices may be made to yield at any required degree of resistance.

It will be noted that although the rake-driving clutches yield when the rakes are subjected to severe strain, they do not release the rakes,

but continue to exert a forward pressure or strain upon them, so that the rakes continue to press forward against the fiber. In this way the mass of fiber, although too large to be carried forward bodily by the rake, is urged constantly forward, so that it is gradually advanced and taken out of the way by the mechanism beyond. In this way, it will be seen, the rake which yields or stops is caused to answer as a feeder to the rake or other feed mechanism beyond, and remaining as it does down within the fiber, it also prevents additional fiber from being advanced from the rear within its own grasp, thus preventing any increase of the resisting mass.

Still another, and perhaps the greatest, advantage arising from the use of the yielding clutches in a machine of this class is the fact that it admits of the bowl being completely filled with fiber, and then the machine being operated continuously, whereby the fiber is permitted to soak a much longer time than usual without stopping the machine.

The elevating and delivering devices control the rate of discharge, and as the rakes or carriers can only advance the fiber at the same rate that it is discharged they remain down and move gradually forward until relieved of the wool in front of them.

In order that the wool may not be taken too rapidly from the tub by the elevator E, a swinging gate, J, is arranged transversely across the tub, directly below the last rake or carrier C', its lower end resting upon the perforated diaphragm B, as shown in Fig. 2, and arranged to swing upward toward the elevator E.

The gate J is composed of a series of parallel teeth or rods, between which the teeth of the last rake or carrier C' pass as the rake descends, whereby the rake is enabled to pass behind a portion of the wool.

The gate J holds back the wool away from the elevator E, and only permits its being delivered thereto through the action of the rear carrier, C', which, falling behind a portion of the wool, as mentioned, draws it through the teeth of the gate J, and carries it over the incline F to the elevator E. In thus drawing the wool through the gate J the fibers are well separated and drawn out.

In the event of the wool becoming sufficiently matted or tangled to prevent its being drawn between the teeth of the gate, the latter will swing upward and allow it to pass off at the ends of the teeth.

The gate J may be weighted or provided with spring or other pressure, to cause it to offer a given amount of resistance before swinging upward.

I am aware that inclined gates or guards have been used in wool-washing machines for the purpose of forcing the fiber during its advance through the bowl or tank beneath the surface of the fluid; but I believe myself to be the first to provide a gravitating gate arranged to operate in conjunction with the last carrier and the elevating mechanism, as shown

and described, so as to control and equalize the discharge of the fiber, and this it is that I now claim.

The incline F, over which the wool is carried to the apron G by the elevator E, may be simply a plane surface; but in practice I prefer to provide its upper face with a series of longitudinal ribs, *l*, upon which the wool is delivered by the carrier C', the ribs serving to hold the wool up from the face of the incline, permitting the liquid to drain off and enabling the elevator to more readily take hold of the wool.

The elevator E consists of a series of pendulent teeth, *m*, mounted in a frame, T, extending transversely across the tub, and having its side bars pivoted at their rear ends to a swinging gallows-frame, U, pivoted at its lower end, and connected at its upper end with a crank, V, through a pitman, *w*, to which pitman the frame T is also connected by links *x*.

By this arrangement a reciprocating motion is imparted to the elevator E, and the teeth *m* are caused to rise in going forward to receive the wool, but to fall as they commence to move back with the same.

The teeth *m* may be either pivoted and free to swing back or they may be rigid, on a portion may be pivoted and the remainder left rigid, as shown in Figs. 1 and 2. When the incline F is furnished with the ribs *l*, the rigid teeth are found to work well, and they are cheaper and stronger in construction.

The wool is delivered to the carrier-apron G over the incline F by the elevator E, and is carried by the apron to or between the presser-rolls, and by them delivered from the machine. It is proposed to employ in this machine a carrier-apron of the form described in a former application, having one or more ribs, *g*, on its inner face, running in the direction of its movement and seated in corresponding grooves in the rollers over which it passes, as shown in Fig. 4.

Instead, however, of forming the apron and its ribs of rubber and in one piece, as in the case mentioned, I prefer to construct it as represented in Fig. 5, in which W represents a facing of rubber and X a backing of heavy cotton-duck, or like material, folded or creased to form ribs *g*, and having the inner space of these folds or ribs filled in with rubber, strips of duck, or other suitable material, as shown.

For the purpose of sustaining the carrier-apron G against sagging, and to assist in guiding the same, a grooved plate, N, is placed directly below its upper half, as shown in Figs. 2 and 4. As above stated, the carrier-apron G may be made to carry the wool between the presser-rolls H, in which case the apron will be carried around the lower presser-roll; or it may simply be arranged to deliver the wool to them, the apron in such case being passed around and carried by a small roller arranged directly in advance of the lower presser-roll.

When passed around the lower press-roll,

the apron G forms a covering therefor; but when not so arranged a special covering for the roll may be provided, as usual, the former arrangement being, however, preferred.

With either arrangement of the carrier-apron and lower press-roll, the upper press-roll may be covered, or, as I deem preferable, it may be furnished with an endless apron, P, passing upward around a smaller roller, *n*, the shaft of which is journaled in pivoted arms R attached to the frame of the machine, said arms having each a downwardly-projecting portion, *r*, bearing upon the shaft of the upper press-roll, which arrangement serves to maintain the roller *n* in its proper position relative to the upper press-roll.

Ordinarily the upper press-roll receives its motion simply through frictional contact with the lower roll, though each is provided with a gear-wheel, *o*, upon the outer end of its shaft, which may be made to mesh with each other when necessary by pressing down upon the levers R, the elastic coverings of the rolls and the wool between them serving at other times to keep the gear-wheels from meshing.

I order that the wool may not be washed back down the apron G by the liquid pressed out by the press-rolls, a roller, I, is placed just in advance of said rolls, serving to prevent its backward movement.

For the purpose of removing the sediment and dirt from the cleansing-liquid a pipe, L, is arranged to open into the lower part of the tub, below the diaphragm B, and is carried thence to a pumping or suction device, K, Figs. 1 and 3, by which the liquid is drawn from the tub and discharged into a filtering or purifying chamber, M. Any suitable pumping device may be employed, though in practice a fan-wheel, P, driven by the same power which operates the rakes, is preferred. The liquid is carried into the chamber or receptacle M at one end, and caused to pass alternately over and under transverse partitions *c*, and, finally, through a screen or strainer, *d*, back into the tub, the heavier particles settling between the partitions, and the lighter ones being retained by the strainer *d*. In this way the liquid is thoroughly purified and rendered susceptible of long-continued use.

It is obvious that suitable openings may be made in the bottom or sides of the filtering-chamber, for removing the sediment which accumulates therein, said openings being furnished with water-tight closing devices; and it is likewise apparent that the filtering apparatus may be modified in construction.

The machine is also capable of use as a rinser, in which case a continuous flow of pure water is kept up through the tub, a portion of the loosened dirt and foreign matter passing off with the outflowing water, while the remaining portion settles at the bottom of the tub when the machine is constructed in the usual manner.

To obviate this settling of the sediment at the bottom of the tub, and provide a means

of removing the same, I furnish an overflow, S, consisting of a box, the upper edge of which is arranged to come just to the water-line, or to the line at which it is desired to maintain the water. From the bottom of this box extend downward two tubes or pipes, *t* and *u*, the former stopping a short distance from the bottom of the tub, while the latter passes down through the same. In this way the water is prevented from flowing off at the surface unless it rises above the usual water-line, in which case the overflow S soon regulates the height of water; but the water is free to enter the lower end of the tube or pipe *t*, flow through the box, and down through the pipe *u* from the tub so long as the level of the water in the tub remains above the bottom of the box S.

It will be observed that the water in passing from the tub is taken from the bottom of the same, thereby insuring the removal of all sediment.

The tubes or pipes *t* and *u* are provided with strainers or screens, to prevent the passage through them of any loose particles of wool, and may, one or both, be furnished with a gate or valve, *v*, by which to close them when the machine is in use as a washer.

For the purpose of bracing the tubular sleeves or bearings *i*, in which the rake or carrier driving shafts are mounted, a bar, Q, is extended from the shaft of the elevator E lengthwise of the tub, connecting the outer ends of said tubular sleeves, as shown in Figs. 1, 2, and 6, the bar being supported by arms *k*, bearing, respectively, upon the transverse shaft of the gate J and a transverse rod, *h*, or upon some portion of the frame of the machine. In this way the sleeves *i* are braced in every direction, and are not therefore liable to become loose or to move or yield when the machine is in operation.

A bar rounded on the under side may be substituted for the guard-roll I, but not with as good results.

I am aware that yielding clutches have been used in various connections, and I therefore lay no broad claim thereto.

The overflow constructed as shown is advantageous in that it offers two courses for the water to the discharge, the upper one of which will answer in case the other is closed, and that it prevents floating particles of fiber from escaping from the bowl.

Having thus described my invention, what I claim is—

1. The combination of a bowl or tank, a discharging or delivering mechanism, a rake or carrier to advance the fiber toward the delivery mechanism, and a driving mechanism having a yielding connection, substantially as described, with the rake or carrier.

2. In a wool-washing machine, the combination of a bowl and two or more carrier-rakes arranged to act successively on the fiber, and connected by yielding devices, substantially as described, with the driving mechanism, so that

they may stop independently, and that one may feed the surplus fiber out of the way in the event of the stoppage of the other.

3. In combination with the tub or tank of a wool-washing machine, a filtering apparatus, substantially as described, arranged to receive liquid from the tub, purify the same, and return it to the tub, whereby the continued use of the liquid is permitted.

4. In combination with the tub of a wool-washing machine and a filtering device, a pumping or suction device, substantially as described, arranged to cause a circulation of the fluid through the filter.

5. In combination with the tubular sleeves *i*, attached to the side of the frame, the bar *Q*, attached to the inner ends of the sleeves, and sustained by connections with the frame or body, substantially as shown.

6. The combination of the rollers *H* and *n*, belt *P*, and levers *R*, sustaining roll *n*, and bearing supported on the journals of the press-roll.

7. In a wool-washing machine, an overflow consisting of an open box or chamber having two tubes, one opening through and the other into the bottom of the bowl, as shown, whereby the usual discharge is from the bottom of the bowl, but any excessive or unusual discharge permitted to take place directly into the top of the box, and thence through the outlet.

FREDERICK G. SARGENT.

Witnesses:

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